Overview Activity Three:

This final activity challenges the students to put the knowledge they have gained about solar energy in the previous two activities to work. The reward to this *reading to perform a task* activity is a tasty, chocolate, marshmallow, and graham cracker snack.

Levels:
Grades K-3

Subject:
- Reading
- Science

Concepts:
- Students will understand that they can help the environment by using less energy from fossil fuels and more energy from renewable energy.
- The sun is hot enough to warm foods and make electicity.

Skills:
- Reading to be informed
- Reading to perform a task
- Following Instructions

Materials:
- Internet access computers
- Solar energy reading selection (p. 16)

Assessment
- Assess the pizza box solar ovens to determine if the students' were able to follow the instructions and read to perform the task.

Getting ready for Activity Three

1. Contact your local pizza shop, and ask them to donate a sufficient number of clean, unused pizza boxes to make Roofus's Solar S'mores. (see page 18).
2. Purchase or solicit donations for the other items from Roofus's Solar S'mores recipe.
3. Make a copy of p. 18 for each student in your class.
4. Consider recruiting parent volunteers or teaching assistants to help the students execute this task.
5. Review the instructions for p. 18 and be prepared to supplement it with additional information to ensure the students' success.
6. Set up team stations with all the materials required to make the solar oven and the s'mores. (Note: depending on class time, you may wish to make the solar ovens one day and the s'mores another day.

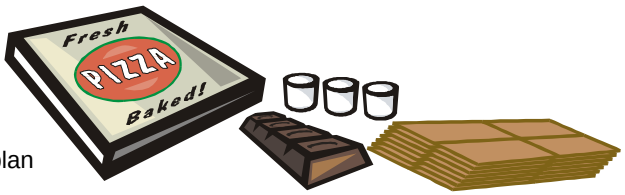
Variation: Teachers with students in the younger grades may wish to complete some of the steps in advance of the class. Alternatively, the Roofus's Pizza Box Solar Oven could be done as a class project, although the number of s'mores produced may not be sufficient for all students in a class.

Doing Activity Three

1. Divide the students into groups, and ask them to go to one of the pizza box solar oven construction stations.
2. Hand out *Build a Pizza Box Solar Oven* construction worksheet to each student. (see p. 18)
3. Tell the students to *read to perform the task* described on this worksheet.
4. If you plan to make the solar s'mores another day, stack the pizza box solar ovens in a safe place in the classroom. If you plan to make the solar s'mores today, proceed to step 5.
5. Divide the students into groups (preferably, the same groups who built the solar ovens), and ask them to go one of the solar s'mores construction stations.
6. Hand out Roofus's Solar S'mores recipe on page 18.
7. Ask the children to *read to perform the task* described on this worksheet.

Extension Activities:

1. Access the other information and or download the other activities from Roofus's web page at http://www.eren.doe.gov/roofus.
2. Download the other energy and environment activities contained on the Earth Day web page at: www.eren.doe.gov/buildings/earthday/ or the other educational activities available from the U.S. Department of Energy. Additional sites to gather energy related information are: www.energy.ca.gov/education/index.html and www.nrel.gov.
3. Explore the environmental impacts of energy efficiency more closely. The energy and environmental slides available from the Earth Day web page (www.eren.doe.gov/buildings/earthday/) referenced above will get you off to a good start.
4. Look for the Project Learning Tree Environmental Education Activity Guide's section on energy and photosynthesis. The book is available from the American Forest Foundation.
5. Go to the library and ask the students to choose a book about energy to read that week. Tell them they can use their new bookmarks to remember where to start reading the next day.



make s'mores in a do-it-yourself solar oven

Build a Pizza Box Solar Oven

From the Webpage

The sun is hot enough to bake food. Here's how to make a simple solar oven that gets hot enough to warm up cookies and other treats, like s'mores. It won't get really hot, though, so you can't bake things in it and you won't burn yourself when playing with it. Be sure to have an adult help you with this!

To make your own solar oven you need:

- One pizza box from a local pizza delivery store. Here's a good excuse to ask your parents to order pizza tonight!
- Newspapers
- Tape
- Scissors
- Black construction paper
- Clear plastic wrap
- Aluminum foil
- A piece of notebook paper
- A pencil or pen
- A ruler or a wooden dowel or a stick

Now you are ready to build:

1. Make sure the cardboard is folded into its box shape and closed.
2. Place the piece of notebook paper in the center of the lid of the box and trace its outline on the lid. Put the piece of paper aside.
3. Carefully cut the two long edges and one of the short edges of the rectangle that you just traced on the lid of the box, forming a flap of cardboard.
4. Gently fold the flap back along the uncut edge to form a crease.
5. Wrap the underside (inside) face of this flap with aluminum foil. Tape it on the other side so that the foil is held firmly. Try to keep the tape from showing on the foil side of the flap. The foil will help to reflect the sunlight into the box.
6. Open the box and place a piece of black construction paper in so it fits the bottom of the box. This will help to absorb the sun's heat.
7. Close the box, roll up some newspaper, and fit it around the inside edges of the box. This is the insulation that helps hold in the sun's heat. It should be about 1 to 1 1/2 inches thick. Use tape to hold the newspaper in place, but only tape it to the bottom of the box, not the lid.
8. Cut two pieces of plastic wrap an inch larger than the flap opening on the box top. Open the box again and tape one piece of plastic wrap to the underside of the flap opening. After taping one side, BE SURE TO PULL THE PLASTIC WRAP TIGHT, and tape down all four sides so the plastic is sealed against the cardboard. Then close the box and tape the other piece of plastic wrap to the top of the flap opening. Again, be sure the plastic wrap is tight and tape down all four edges to form a seal. This creates a layer of air as insulation that helps keep the sun's heat in the box.

Finished building Let's give it a try!

On a sunny day, pick a treat to warm up and carry it and the box outside to a sunny spot. If it's cold outside, put a towel or blanket under the box so the bottom doesn't get cold. Open the box, put the treat in the center, and close the box. Now open the flap and turn the box so the foil is facing the sun. The shadow of the flap should go straight back from the back of the box. Move the flap up and down and note how it reflects the sunlight. Use a dowel, ruler, or stick to prop up the flap so that it bounces the sunlight into the box.

Wait about a half hour for the box to warm up in the sun. Then enjoy your warmed-up treat!

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